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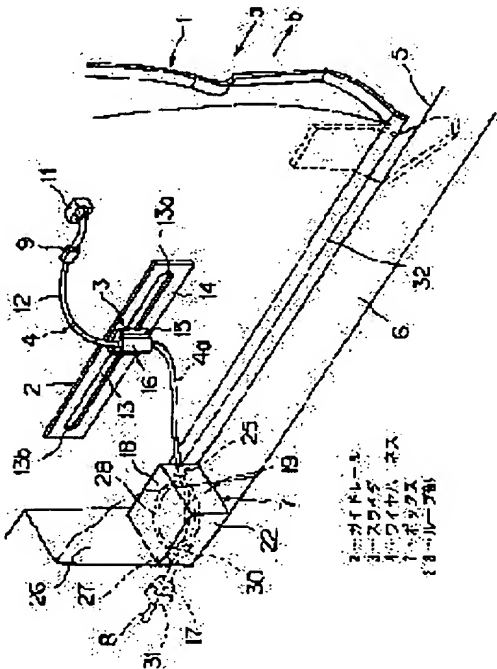
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(54) POWER SUPPLY STRUCTURE FOR SLIDE DOOR

(57)Abstract:

PROBLEM TO BE SOLVED: To allow a wire harness provided between a slide door and a motor vehicle body to absorb its looseness and ease its tension, easily and securely.

SOLUTION: A slide door 1 is provided with a guide rail 2 to which a slider 3 is jointed, and a middle part of the length of a wire harness 4 is fixed to the slider 3. One end of the wire harness is led to the slide door side, and the other end of the slide door is led to the motor vehicle body side where a box 7 is provided on a step 6 of a motor vehicle body 5, wherein the wire harness 4 between the slider 3 and the motor vehicle body 5 is wound up in loop shape to be contained in the box. The wire harness loop 28 in the box extends or contracts to absorb a looseness of the wire harness between the slider and the motor vehicle body. Upon full opening of the slide door 1, the slider 3 is to be pushed to the one end of a guide rail 2, while, upon full closing of the slide door 1, the slider 3 is to be pushed to the other end of the guide rail 2.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the electric supply structure of the slide door which made absorbable the slack of the wire harness in the structure of ****(ing) wire harness between the slide door of an automobile, and the car body, and performing regular electric supply to a slide door to it.

[0002]

[Description of the Prior Art] In order to supply the electrical and electric equipment to each functional part of the slide door used for a one-box car, a wagon vehicle, etc. from a car body side (power-source side) or to send an electrical signal to slide door side empty vehicle both the bodies side, the electric supply structure of the conventional versatility is proposed.

[0003] Various functional parts, such as a power window motor, a door-lock unit, a loudspeaker, a switch unit, or an electronic control unit, are carried in the slide door. Although a power-source current and the signal current are supplied thru/or received to these functional parts, when a slide door is shut and it opens [not to mention], these electric supply and power receiving are needed.

[0004] Drawing 3 (a) and (b) show one gestalt of the electric supply structure of the conventional slide door indicated by JP,7-222274,A.

[0005] In connection with the switching action of a slide door 118, the reel 120 which can roll [a delivery and] round round an electric wire (wire harness) 119 is formed in the car body 121 side, through the hinge 122, it connects with the loudspeaker 123 which is a functional part by the side of a door, and, as for this structure, the end side of an electric wire 119 is connected to the audio (not shown) which is a functional part by the side of the car body for the other end side of a electric wire 119.

[0006] Drawing 3 (a) It lets out an electric wire 119 from a reel 120 at the time of close [of a slide door 118], extends, and is drawing 3 (b). An electric wire 119 is rolled round by the reel 120 at the time of open [of a slide door].

[0007]

[Problem(s) to be Solved by the Invention] However, if it is in the above-mentioned structure, in order to have to roll round an electric wire several times over to a reel, there was concern of being easy to mourn over an electric wire. Moreover, in wire harness with many circuits, since flexibility was bad, there was a problem that application was difficult.

[0008] These people set to Japanese Patent Application No. No. 374770 [11 to] previously that these problems should be solved. Prepare the horizontal guide rail of a slide door and a slider is made to engage with a guide rail free [a slide]. Fix the wire harness by the side of a slide door to a slider, apply to the connector connection of the wire harness by the side of slider empty vehicle both the bodies, and the wire harness by the side of a slide door is incurvated in the shape of abbreviation for U characters. The electric supply structure (not shown) of a slide door of making the tensile force of the wire harness by the side of the slide door at the time of closing motion of a slide door etc. absorbing was proposed.

[0009] However, if it was in this structure, it is the relation which is incurvating wire harness between a slide door and the car body, wire harness tended to slacken, and there was concern of being easy to be put between a slide door and the car body. Moreover, since the long guide rail over an overall length of a slide door was mostly used in order to make the slack of the wire harness at the time of closing motion of a slide door absorb, there was a problem of the degree of freedom of arrangement, such as an increase of weight by enlargement of a guide rail and a functional part by the side of a slide door being restricted.

[0010] This invention does not have a fear of wire harness being inserted between a slide door and the car body in view of above-mentioned each point, and can prevent enlargement of a guide rail, and aims at offering the electric supply structure.

of the slide door which can cancel a limit of the degree of freedom of arrangement, such as an increase of weight, and a functional part by the side of a slide door.

[0011]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention prepares a guide rail in a slide door. Make a slider engage with this guide rail, enabling a free slide, and the longitudinal direction part intermediate of wire harness is fixed to this slider. In the electric supply structure of a slide door where ****(ed) one side of this wire harness to this slide door side, and another side of this wire harness was ****(ed) to the car body side A box 7 is established in said car body side, and in this box, said wire harness between said slider and this car body is rolled in the shape of a loop formation, and is held. It is characterized by the slack of this wire harness between this slider and this car body being absorbed by expanding and contracting of the loop-formation section of the wire harness in this box (claim 1). It is also effective before full open of said slide door that said slider contacts the end section of said guide rail (claim 2). Moreover, it is also effective before the close by-pass bulb completely of said slide door that said slider contacts the other end of said guide rail (claim 3). Moreover, it is also effective that the part following loop-formation section empty vehicle both the bodies side of said wire harness was fixed in said box (claim 4). Moreover, it is also effective that said box was arranged in the step section of said car body (claim 5). Moreover, it is also effective that said guide rail replaced with said slide door, and was prepared in said car body side, and said box replaced with said car body, and was established in said slide door side (claim 6).

[0012]

[Embodiment of the Invention] The gestalt of operation of this invention is explained at a detail using a drawing below. Drawing 1 shows 1 operation gestalt of the electric supply structure of the slide door concerning this invention.

[0013] This structure forms the shorter guide rail 2 horizontal to a slide door 1. Make a slider 3 engage with a guide rail 2 enabling a free slide, and the longitudinal direction part intermediate of the wire harness 4 by the side of a slide door is fixed to a slider 3. In the step section 6 of the car body 5, a connection side with the wire harness 8 by the side of the tip of the wire harness 4 by the side of a slide door, i.e., the car body, is held in the shape of a loop formation in a box 7. It is characterized by what (it absorbed) the slack of the wire harness 4 by the side of the slide door between a slide door 1 and the car body 5 was abolished for.

[0014] It is fixed to the front face of the panel 10 of a slide door 1 with the first clip (holddown member) 9, and the connector 11 by the side of an end face is connected to the functional part in a slide door (not shown) by the end face side of the wire harness 4 by the side of a slide door. The connector 11 may be introduced in the slide door.

[0015] Wire harness 4 coils two or more electric wires with a vinyl tape, and is constituted. Even if it opens spacing and winds roughly, how to roll a vinyl tape may wind densely, without opening spacing, or whichever is sufficient as it. It is also possible to use one cable as wire harness 4. Moreover, two or more electric wires may be made to insert in the interior of the corrugate tube (not shown) in which the expansion and contraction made of synthetic resin are free, and wire harness may be made to constitute.

[0016] Allowance (extra length) 12 can be giving wire harness 4 between the first clip 9 and a slider 3. This allowance 12 is set up so that it may become max in the state of full open of a slide door 1 (the slide door 1 serves as a half-aperture in the state of drawing 1) and may become min or zero in the state of the close by-pass bulb completely of a slide door 1.

[0017] The first clip 9 consists of a part (not shown) which curved in the approximate circle configuration by being made from synthetic resin, and a fixed portion (not shown) following a part for a bend, a fixed portion has the stop section (not shown) of the shape of an umbrella of a flexible pair, and the stop section is inserted in the hole (not shown) of the panel 10 of a slide door 1, and is engaged.

[0018] In addition, it may replace with a part for a bend, a tabular part may be formed, and winding immobilization of the wire harness 4 may be carried out with a vinyl tape at a tabular part. Moreover, a fixed portion is formed in tabular, it may replace with the stop section, a bolt insertion hole may be prepared, and a fixed portion may be fixed to a panel with a bundle with a bolt. Moreover, the first clip 9 may be formed in the panel 10 of the product made of the synthetic resin of slide door 1 thru/or metal, and one in the shape of a hook.

[0019] Anyway, it is required to fix wire harness 4 to a slide door 1 without a location gap with the first clip 9, and to make it tensile force not act on a connector 11 at the time of slide door closing motion.

[0020] Wire harness 4 is rocked forward and backward between the first clip 9 and a slider 3 at the time of closing motion of a slide door 1. This is exactly because a slider 3 moves to a cross direction relatively along with a guide rail 2.

[0021] A guide rail 2 retreats to a slide door 1 and one by aperture actuation of a slide door 1, it stops at an orientation mostly, a slider 3 being back lengthened a little by friction with a guide rail 2, and a slider 3 contacts front end 13a of the guide hole 13 of a guide rail 2. Moreover, a guide rail 2 moves forward to a slide door 1 and one by closing actuation of a slide door 1, it stops at an orientation mostly, a slider 3 being ahead lengthened a little by friction with a guide rail 2, and

slider 3 contacts back end 13b of the guide hole 13. Ushiro explains these operations to a detail.

[0022] A guide rail 2 is the lower limit section approach of a slide door 1, and is arranged at the second half section side of a slide door 1. The die length of this guide rail 2 is short set up with about 1 of the die length of a slide door 1 / two to 2/3.

[0023] The guide rail 2 consists of guide holes 13 of the shape of a slit established in the center of the height direction of oblong rectangle-like Itabe 14 and Itabe 14 (the shape of a long hole) by being made from synthetic resin or a metal. Itabe 14 is fixed to the panel 10 of a slide door 1, and the guide hole 13 is fixing Itabe 14 to a panel 10 with a stanchion (not shown) following the long hole (not shown) prepared in the panel 10, and follows the space on Itabe's 14 background.

[0024] The slider 3 consists of the substrate section 15 which ****s on the front face of Itabe 14 of a guide rail 2, a shank (not shown) projected in the guide hole 13 from the substrate section 15, a flange (not shown) which is prepared at the tip of a shank and ****s on the background of a guide rail 2, and a harness fixed part 16 prepared in the side front of the substrate section 15. It is fixing to the substrate section 15 with a bolt Itabe (not shown) who the harness fixed part's 16 is formed in half-annular, for example, has the harness fixed part 16 in one, and pinching immobilization of the wire harness 4 is carried out between the harness fixed part 16 and the substrate section 15. The structure of these guide rails 2 or a slider 3 is proposal settled in previous Japanese Patent Application No. No. 374770 [11 to].

[0025] Passage partial 4a of the wire harness 4 drawn from the harness fixed part 16 is connected to the wire harness 8 by the side of the car body by the connectors 17 and 31 of a male and a female by the outlet side of a box 7 through the inside of a box 7.

[0026] The box 7 is being horizontally fixed to the back end side of the step section 6 of the car body 5 in the condition of every width (every Taira). As shown also in drawing 2 , a box 7 is preferably made from synthetic resin, when reinforcement is required, it is formed [stepping on on foot, etc. and] in the shape of [liable to flat] a rectangle stereo by being made from a metal, and consists of an upper wall (covering device) 18 (drawing 1) of the rectangle near a square thru/or a square, each walls 19-22 with the low height of front and rear, right and left, and a bottom wall 23 (drawing 2) that counters an upper wall 18.

[0027] Notching formation of the opening 25 for harness installation is carried out at the wall 21 (drawing 2) on the left-hand side of the box 7 which counters a slide door 1, and notching formation of the opening 27 for harness derivation is carried out at the wall 20 on the backside [the box 7 joined to the posterior wall of stomach 26 of the step section 6 (drawing 1)], i.e., the left-hand side wall 21 and the wall which intersects perpendicularly. The opening 27 for harness derivation is mostly located on the diagonal line with the opening 25 for harness installation. The loop-formation section 28 of wire harness 4 is horizontally located in a box 7.

[0028] the opening 25 for harness installation -- setting -- wire harness 4 -- almost -- truth -- direct induction part 4b can move freely to the interior and the exterior of a box 7 like an arrow head c, without spoiling freedom in any way. The wire harness 4 introduced in the box 7 is rolled one in the shape of a loop formation, and is carried out in the space 29 of the shape of a rectangle in a box 7, and partial 4c which curved in the shape of radii a little following the loop-formation section 28 is being fixed to the inside of the wall 20 on the right-hand side of a box 7 with the second clip (holddown member) 30 [near the opening 27 for harness derivation]. The connector 17 for connecting with the wire harness 8 (drawing 1) by the side of the car body on the outside of opening 27 is formed in 4d of derivation parts of wire harness 4

[0029] In a box 7, any structures other than the second clip 30 are not prepared, but structure is simplified extremely. In addition, it is also possible to protrude the boss section (not shown) for carrying out location appearance of the core of the loop-formation section 28 of wire harness 4 to the bottom wall 23 or upper wall 18 (drawing 1) of a box 7, and making it.

[0030] Curve formation of the second clip 30 is carried out by resin shaping at a box 7 and one at the shape of an abbreviation semicircle, lower limit 30b has a clearance between the insides of a wall 22 following one in the inside of the wall 22 of a box 7, and bending [facing up] is inside possible for upper limit 30a. Wire harness 4 is inserted inside the second clip 30 from the clearance which carried out opening greatly where the second clip 30 is sagged on the direction outside of a path.

[0031] Structure is low-cost[simplification and]-ized by carrying out resin shaping of the second clip 30 at a box 7 and one. The opening 27 for harness derivation serves also as the mold omission hole at the time of clip shaping.

[0032] In addition, the second clip 30 is formed in another object with synthetic resin or a metal in a box 7, and you may make it fix to a box 7 by **** etc. In this case, the configuration of the second clip 30 may consist of a part which curved in the approximate circle configuration, and a fixed portion following a part for a bend like the first clip 9 (drawing 1). Moreover, the second clip 30 may be formed in the wall 19 by the side of before a box 7, and the opening 27 for harness derivation may be formed in the wall 22 on the right-hand side of a box 7.

[0033] As for the upper wall (covering device) 18 (drawing 1) of a box 7, it is desirable to make closing motion free, it is also possible to form a upper wall 18 in which the vertical walls 19-22 and one through the hinge of for example, thin meat, and it is possible to also make it stop with a stop means (not shown) by which a upper wall 18 is said to a wall with an opposite hinge as a stop projection and the piece of an engagement frame in that case.

[0034] Moreover, it is also possible to eliminate the bottom wall 23 of a box 7 and to serve as a bottom wall 23 in respect of the upper wall of the step section 6 (drawing 1). Moreover, it is possible to open the walls 19 and 21, to incurvate wire harness 4 in the shape of a loop formation, to set [enable closing motion of walls other than a upper wall (for example, walls 19 and 21 of a before side or left-hand side),] in a box 7, and to also make a connector 17 draw from the harness derivation section 27.

[0035] Moreover, it is also possible to form a box 7 in the step section 6 and one. In this case, as for at least one wall (it does not restrict to a upper wall 18) of a box 7, it is desirable for it to be able to open and close. the object for harness installation, and the openings 25 and 27 for derivation -- almost -- a vertical angle -- or it cannot be overemphasized that : prepares face to face.

[0036] Also in the box of which gestalt, the tooth space in the rectangle-like box 7 can be effectively used by forming mostly the object for harness installation, and the openings 25 and 27 for derivation on the diagonal line. That is, partial 4b by the side of installation of wire harness 4 is located in one corner of a box 7, partial 4c by the side of derivation of wire harness 4 is located in the corner of another side of a box 7, and the diameter of the loop-formation section 28 of wire harness 4 is expanded using the maximum in space other than four corners of a box 7. Chain-line 28' shows the diameter reduction condition of the loop-formation section 28 by drawing 2 .

[0037] Moreover, it is also possible to arrange a box 7 in the back end side of the step section 6 every (perpendicular) length in drawing 1 . Said level bottom wall 23 (drawing 2) turns into a perpendicular front wall, said perpendicular front wall 19 turns into a level upper wall, in this case, said level upper wall 18 of a box 7 joins to the perpendicular back end wall 26 of the step section 6, it becomes a perpendicular posterior wall of stomach, and the perpendicular walls 21 and 22 on either side turn into [said perpendicular posterior wall of stomach 20 turns into a level bottom wall, and] a perpendicular wall on either side which started. The loop-formation section 28 of wire harness 4 is perpendicularly located in a box 7.

[0038] carrying out a box 7 every length -- the effective area of the step section 6 -- increasing (a step side being expanded) -- the opening 25 for harness installation becomes the almost same height as a guide rail 2, and the slack of wire harness 4 is suppressed further from a guide rail 2 before a box 7.

[0039] Like drawing 1 , by having incurvated the wire harness 4 by the side of the slide door which continues to the wire harness 8 by the side of guide-rail 2 empty-vehicle both the bodies in the shape of a loop formation, and having held it in the box 7 by the side of the step section, the slack of the wire harness 4 at the time of closing motion of a slide door 1 is absorbed in a box 7, and an insert lump of the wire harness 4 of a between [a slide door 1 and the car bodies 5] is prevented.

[0040] Moreover, a guide rail 2 can be shortened by the diameter of the loop-formation section 28 of the wire harness 4 in a box 7 being reduced at the time of the close by-pass bulb completely of a slide door 1, and wire harness 4 being extended, and lightweight-izing and low-cost-izing of a guide rail 2, shortening of the wire harness 4 from the first clip 9 to a slider 3, and the fall that flusters are possible.

[0041] That is, in drawing 1 , a slide door 1 is in the condition of a half-aperture, and the wire harness 4 by the side of a slide door is held in the shape of a loop formation with the big path in the box 7. It follows on making a slide door 1 slide back like an arrow head a, and opening it from this condition. A guide rail 2 retreats to a slide door 1 and one, and the slider 3 which fixed wire harness 4 moves back for a while by frictional force with a guide rail 2. Under the present circumstances, the wire harness 4 of the moved die length of a slider 3 makes the diameter of the loop-formation section 28 in a box 7 reduce a little, and lets out from a box 7. **** of wire harness 4 is prevented by that cause, and, subsequently to front end 13a of the guide hole 13 of a guide rail 2, a slider 3 runs. Wire harness 4 is pulled, from a box 7 the diameter of the loop-formation section 28 of wire harness 4 is reduced by it, and it lets out to like [of drawing 2 / chain-line 28'] by it.

[0042] Thereby, it is prevented by wire harness 4 at the time of aperture actuation of a slide door 1 that impossible tensile force acts. Moreover, since wire harness 4 is held between a slide door 1 and the car body 5 at the condition (condition no slackening) of having always stretched with the pin mostly, it is prevented that passage partial 4a of wire harness 4 is put between the lower limits 32 and the car bodies 5 of a slide door 1. Moreover, since what is necessary is just to locate the front end section of a guide rail 2 in the longitudinal direction pars intermedia instead of the front end side of a slide door 1, the degree of freedom of arrangement of a functional part increases in the first half side of a slide door 1.

[0043] Following on making a slide door 1 slide ahead like an arrow head b from the full open condition of a slide door 1

and closing, a guide rail 2 moving forward to a slide door 1 and one, and a slider 3 moving forward by frictional force with a guide rail 2. Wire harness 4 is sent in in a box 7, and is rolled in the shape of a loop formation. When the diameter of the loop-formation section 28 is expanded gradually and a slider 3 and a box 7 are located in the minimum distance, the path of the loop-formation section 28 serves as max. When follow on a slider 3 being lengthened ahead, the loop-formation section 28 reduces the diameter gradually, wire harness 4 is pulled out from a box 7 and elongation and a slider 3 run against back end 13b of the guide hole 13. The loop-formation section 28 reduces the diameter greatly, and wire harness 4 lets out from a box 7.

[0044] It is prevented that tensile force with wire harness 4 impossible for acts by this at the time of closing actuation of a slide door 1. Moreover, since wire harness 4 is held between a slide door 1 and the car body 5 at the condition (condition not slackening) of having always stretched with the pin mostly, it is prevented that wire harness 4 is put between the lower limits 32 and the car bodies 5 of a slide door 1. Moreover, since a twist is also large and the back end section of a guide rail 2 can be located in the back end section of a slide door 1 to the front, the degree of freedom of arrangement of the functional part in the back end section of a slide door 1 increases.

[0045] Moreover, following on making a slide door 1 slide to back from a close-by-pass-bulb-completely condition, and opening it, a guide rail 2 retreating to a slide door 1 and one, and a slider 3 retreating by frictional force with a guide rail 2, wire harness 4 is rounded in a box 7, is gradually rolled in the shape of a loop formation, slack is absorbed, and when a slider 3 and a box 7 are located in the minimum distance, the path of the loop-formation section 28 serves as max. The loop-formation section 28 reducing the diameter gradually like the above-mentioned, it lets out from a box 7 and impossible **** of wire harness 4 is prevented by the back.

[0046] In addition, although the guide rail 2 was formed in the slide door side in the above-mentioned operation gestalt and the box 7 was established in the car body side, this thing [forming a guide rail 2 in a car body side conversely, and establishing a box 7 in a slide door side] is also possible. In this case, the wire harness 8 by the side of the car body is fixed to a slider 3, and the wire harness 8 by the side of the car body is held in the shape of a loop formation in a box 7. pass a slider 3 and the first fixed part (clip) 9 from a box 7 in the wire harness 8 by the side of a slide door -- it is also possible to **** to a connector 11 and to carry out the connector joint of the wire harness 4 by the side of a slide door to connector 11.

[0047] Moreover, it is also possible to arrange a box 7 behind parts 26 other than the step section of the car body 5, for example, the back end wall of the step section 6. Moreover, the number of turns of the loop-formation section 28 of said wire harness 4 can also be carried out to not 1 volume but two rolls thru/or more than it. Moreover, a slider 3 runs against front end (end) 13a of the guide slot 13 of a guide rail 2 before full open of a slide door 1, and/or it is also possible to adjust the die length and the location of a guide rail 2 so that a slider 3 may run against back end (other end) 13b of the guide slot 13 in front of the close by-pass bulb completely of a slide door 1.

[0048]

[Effect of the Invention] Like the above, according to invention according to claim 1, the slack of wire harness is absorbed and impossible crookedness of an insert lump of the wire harness of a between [a slide door and the car bodies] or wire harness is prevented because the wire harness over which the slide door was built from the car body expands the diameter in the shape of a loop formation in a box at the time of closing motion of a slide door. Moreover, similarly, wire harness lets out from a box and develops because wire harness reduces the diameter in a box at the time of closing motion of a slide door, and impossible **** of wire harness is prevented. The bruise of wire harness, deformation, etc. are prevented by these. Moreover, since components with a swinging arm special as a slack absorber style of wire harness etc. are not used, structure is easy, and is low-cost-ized and a man day with a group is also reduced.

[0049] Moreover, according to invention according to claim 2, migration of the slider beyond it is prevented, the loop-formation section of the wire harness in a box reduces the diameter and lets out because a slider contacts the end section of a guide rail before full open of a slide door, and door opening of a slide door is performed smoothly, impossible **** of wire harness being prevented by that cause. Shortening by the side of the end section of a guide rail is attained by this, and it becomes expandable [the degree of freedom of arrangement of the functional part by the side of the formation of small lightweight and low-cost-izing, and the slide door of a guide rail].

[0050] Moreover, according to invention according to claim 3, migration of the slider beyond it is prevented like claim 2, the loop-formation section of the wire harness in a box reduces the diameter and lets out because a slider contacts the other end of a guide rail in front of the close by-pass bulb completely of a slide door, and the closedown of a slide door is performed smoothly, impossible **** of wire harness being prevented by that cause. Shortening by the side of the other end of a guide rail is attained by this, and it becomes expandable [the degree of freedom of arrangement of the functional part by the side of much more formation of small lightweight and low-cost-izing, and the slide door of a guide rail].

[0051] Moreover, according to invention according to claim 4, at the time of **** of wire harness, the diameter of the

loop-formation section in a box is reduced certainly, it lets out, and wire harness is certainly transferred in the shape of a loop formation into a box at the time of the slack of wire harness. Thereby, absorption of slack of wire harness and prevention of **** are much more ensured.

[0052] Moreover, according to invention according to claim 5, since a box can be easily attached to the step section of the car body, the workability with a group of a box improves. Moreover, since a box can be arranged in the location or the near location which counters mostly to the guide rail by the side of a slide door, the slack of the wire harness covered over slide door empty vehicle both the bodies is suppressed to the minimum, and the wire harness hold effectiveness of a box is promoted further.

[0053] Moreover, according to invention according to claim 6, the same effectiveness as claims 1-3 is done so by arranging a guide rail in a car body side, when there are many functional parts of a slide door, and arranging a box in a slide door side.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the electric supply structure of the slide door which made absorbable the slack of the wire harness in the structure of ****(ing) wire harness between the slide door of an automobile, and the car body, and performing regular electric supply to a slide door to it.

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PRIOR ART

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[0003] Various functional parts, such as a power window motor, a door-lock unit, a loudspeaker, a switch unit, or an electronic control unit, are carried in the slide door. Although a power-source current and the signal current are supplied thru/or received to these functional parts, when a slide door is shut and it opens [not to mention], these electric supply and power receiving are needed.

[0004] Drawing 3 (a) and (b) show one gestalt of the electric supply structure of the conventional slide door indicated by JP,7-222274,A.

[0005] In connection with the switching action of a slide door 118, the reel 120 which can roll [a delivery and] round round an electric wire (wire harness) 119 is formed in the car body 121 side, through the hinge 122, it connects with the loudspeaker 123 which is a functional part by the side of a door, and, as for this structure, the end side of an electric wire 119 is connected to the audio (not shown) which is a functional part by the side of the car body for the other end side of a electric wire 119.

[0006] Drawing 3 (a) It lets out an electric wire 119 from a reel 120 at the time of close [of a slide door 118], extends, and is drawing 3 (b). An electric wire 119 is rolled round by the reel 120 at the time of open [of a slide door].

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EFFECT OF THE INVENTION

[Effect of the Invention] Like the above, according to invention according to claim 1, the slack of wire harness is absorbed and impossible crookedness of an insert lump of the wire harness of a between [a slide door and the car bodies] or wire harness is prevented because the wire harness over which the slide door was built from the car body expands the diameter in the shape of a loop formation in a box at the time of closing motion of a slide door. Moreover, similarly, wire harness lets out from a box and develops because wire harness reduces the diameter in a box at the time of closing motion of a slide door, and impossible **** of wire harness is prevented. The bruise of wire harness, deformation, etc. are prevented by these. Moreover, since components with a swinging arm special as a slack absorber style of wire harness etc. are not used, structure is easy, and is low-cost-ized and a man day with a group is also reduced.

[0049] Moreover, according to invention according to claim 2, migration of the slider beyond it is prevented, the loop-formation section of the wire harness in a box reduces the diameter and lets out because a slider contacts the end section of a guide rail before full open of a slide door, and door opening of a slide door is performed smoothly, impossible **** of wire harness being prevented by that cause. Shortening by the side of the end section of a guide rail is attained by this, and it becomes expandable [the degree of freedom of arrangement of the functional part by the side of the formation of small lightweight and low-cost-izing, and the slide door of a guide rail].

[0050] Moreover, according to invention according to claim 3, migration of the slider beyond it is prevented like claim 2, the loop-formation section of the wire harness in a box reduces the diameter and lets out because a slider contacts the other end of a guide rail in front of the close by-pass bulb completely of a slide door, and the closedown of a slide door is performed smoothly, impossible **** of wire harness being prevented by that cause. Shortening by the side of the other end of a guide rail is attained by this, and it becomes expandable [the degree of freedom of arrangement of the functional part by the side of much more formation of small lightweight and low-cost-izing, and the slide door of a guide rail].

[0051] Moreover, according to invention according to claim 4, at the time of **** of wire harness, the diameter of the loop-formation section in a box is reduced certainly, it lets out, and wire harness is certainly transferred in the shape of a loop formation into a box at the time of the slack of wire harness. Thereby, absorption of slack of wire harness and prevention of **** are much more ensured.

[0052] Moreover, according to invention according to claim 5, since a box can be easily attached to the step section of the car body, the workability with a group of a box improves. Moreover, since a box can be arranged in the location or the near location which counters mostly to the guide rail by the side of a slide door, the slack of the wire harness covered over slide door empty vehicle both the bodies is suppressed to the minimum, and the wire harness hold effectiveness of a box is promoted further.

[0053] Moreover, according to invention according to claim 6, the same effectiveness as claims 1-3 is done so by arranging a guide rail in a car body side, when there are many functional parts of a slide door, and arranging a box in a slide door side.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, if it is in the above-mentioned structure, in order to have to roll round an electric wire several times over to a reel, there was concern of being easy to mourn over an electric wire. Moreover, in wire harness with many circuits, since flexibility was bad, there was a problem that application was difficult.

[0008] These people set to Japanese Patent Application No. No. 374770 [11 to] previously that these problems should be solved. Prepare the horizontal guide rail of a slide door and a slider is made to engage with a guide rail free [a slide]. Fix the wire harness by the side of a slide door to a slider, apply to the connector connection of the wire harness by the side of slider empty vehicle both the bodies, and the wire harness by the side of a slide door is incurvated in the shape of abbreviation for U characters. The electric supply structure (not shown) of a slide door of making the tensile force of the wire harness by the side of the slide door at the time of closing motion of a slide door etc. absorbing was proposed.

[0009] However, if it was in this structure, it is the relation which is incurvating wire harness between a slide door and the car body, wire harness tended to slacken, and there was concern of being easy to be put between a slide door and the car body. Moreover, since the long guide rail over an overall length of a slide door was mostly used in order to make the slack of the wire harness at the time of closing motion of a slide door absorb, there was a problem of the degree of freedom of arrangement, such as an increase of weight by enlargement of a guide rail and a functional part by the side of a slide door being restricted.

[0010] This invention does not have a fear of wire harness being inserted between a slide door and the car body in view of above-mentioned each point, and can prevent enlargement of a guide rail, and aims at offering the electric supply structure of the slide door which can cancel a limit of the degree of freedom of arrangement, such as an increase of weight, and a functional part by the side of a slide door.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention prepares a guide rail in a slide door. Make a slider engage with this guide rail, enabling a free slide, and the longitudinal direction pars intermedia of wire harness is fixed to this slider. In the electric supply structure of a slide door where ****(éd) one side of this wire harness to this slide door side, and another side of this wire harness was ****(ed) to the car body side A box 7 is established in said car body side, and in this box, said wire harness between said slider and this car body is rolled in the shape of a loop formation, and is held. It is characterized by the slack of this wire harness between this slider and this car body being absorbed by expanding and contracting of the loop-formation section of the wire harness in this box (claim 1). It is also effective before full open of said slide door that said slider contacts the end section of said guide rail (claim 2). Moreover, it is also effective before the close by-pass bulb completely of said slide door that said slider contacts the other end of said guide rail (claim 3). Moreover, it is also effective that the part following loop-formation section empty vehicle both the bodies side of said wire harness was fixed in said box (claim 4). Moreover, it is also effective that said box was arranged in the step section of said car body (claim 5). Moreover, it is also effective that said guide rail replaced with said slide door, and was prepared in said car body side, and said box replaced with said car body, and was established in said slide door side (claim 6).

[0012]

[Embodiment of the Invention] The gestalt of operation of this invention is explained at a detail using a drawing below. Drawing 1 shows 1 operation gestalt of the electric supply structure of the slide door concerning this invention.

[0013] This structure forms the shorter guide rail 2 horizontal to a slide door 1. Make a slider 3 engage with a guide rail 2 enabling a free slide, and the longitudinal direction pars intermedia of the wire harness 4 by the side of a slide door is fixed to a slider 3. In the step section 6 of the car body 5, a connection side with the wire harness 8 by the side of the tip of the wire harness 4 by the side of a slide door, i.e., the car body, is held in the shape of a loop formation in a box 7. It is characterized by what (it absorbed) the slack of the wire harness 4 by the side of the slide door between a slide door 1 and the car body 5 was abolished for.

[0014] It is fixed to the front face of the panel 10 of a slide door 1 with the first clip (holddown member) 9, and the connector 11 by the side of an end face is connected to the functional part in a slide door (not shown) by the end face side of the wire harness 4 by the side of a slide door. The connector 11 may be introduced in the slide door.

[0015] Wire harness 4 coils two or more electric wires with a vinyl tape, and is constituted. Even if it opens spacing and winds roughly, how to roll a vinyl tape may wind densely, without opening spacing, or whichever is sufficient as it. It is also possible to use one cable as wire harness 4. Moreover, two or more electric wires may be made to insert in the interior of the corrugate tube (not shown) in which the expansion and contraction made of synthetic resin are free, and wire harness may be made to constitute.

[0016] Allowance (extra length) 12 can be giving wire harness 4 between the first clip 9 and a slider 3. This allowance 12 is set up so that it may become max in the state of full open of a slide door 1 (the slide door 1 serves as a half-aperture in the state of drawing 1) and may become min or zero in the state of the close by-pass bulb completely of a slide door 1.

[0017] The first clip 9 consists of a part (not shown) which curved in the approximate circle configuration by being made from synthetic resin, and a fixed portion (not shown) following a part for a bend, a fixed portion has the stop section (not shown) of the shape of an umbrella of a flexible pair, and the stop section is inserted in the hole (not shown) of the panel 10 of a slide door 1, and is engaged.

[0018] In addition, it may replace with a part for a bend, a tabular part may be formed, and winding immobilization of the wire harness 4 may be carried out with a vinyl tape at a tabular part. Moreover, a fixed portion is formed in tabular, it may replace with the stop section, a bolt insertion hole may be prepared, and a fixed portion may be fixed to a panel with a bundle with a bolt. Moreover, the first clip 9 may be formed in the panel 10 of the product made of the synthetic resin of

slide door 1 thru/or metal, and one in the shape of a hook.

[0019] Anyway, it is required to fix wire harness 4 to a slide door 1 without a location gap with the first clip 9, and to make it tensile force not act on a connector 11 at the time of slide door closing motion.

[0020] Wire harness 4 is rocked forward and backward between the first clip 9 and a slider 3 at the time of closing motion of a slide door 1. This is exactly because a slider 3 moves to a cross direction relatively along with a guide rail 2.

[0021] A guide rail 2 retreats to a slide door 1 and one by aperture actuation of a slide door 1, it stops at an orientation mostly, a slider 3 being back lengthened a little by friction with a guide rail 2, and a slider 3 contacts front end 13a of the guide hole 13 of a guide rail 2. Moreover, a guide rail 2 moves forward to a slide door 1 and one by closing actuation of a slide door 1, it stops at an orientation mostly, a slider 3 being ahead lengthened a little by friction with a guide rail 2, and slider 3 contacts back end 13b of the guide hole 13. Ushiro explains these operations to a detail.

[0022] A guide rail 2 is the lower limit section approach of a slide door 1, and is arranged at the second half section side of a slide door 1. The die length of this guide rail 2 is short set up with about 1 of the die length of a slide door 1 / two to 2/3.

[0023] The guide rail 2 consists of guide holes 13 of the shape of a slit established in the center of the height direction of oblong rectangle-like Itabe 14 and Itabe 14 (the shape of a long hole) by being made from synthetic resin or a metal. Itabe 14 is fixed to the panel 10 of a slide door 1, and the guide hole 13 is fixing Itabe 14 to a panel 10 with a stanchion (not shown) following the long hole (not shown) prepared in the panel 10, and follows the space on Itabe's 14 background.

[0024] The slider 3 consists of the substrate section 15 which *****s on the front face of Itabe 14 of a guide rail 2, a shank (not shown) projected in the guide hole 13 from the substrate section 15, a flange (not shown) which is prepared at the tip of a shank and *****s on the background of a guide rail 2, and a harness fixed part 16 prepared in the side front of the substrate section 15. It is fixing to the substrate section 15 with a bolt Itabe (not shown) who the harness fixed part's 16 is formed in half-annular, for example, has the harness fixed part 16 in one, and pinching immobilization of the wire harness 4 is carried out between the harness fixed part 16 and the substrate section 15. The structure of these guide rails 2 or a slider 3 is proposal settled in previous Japanese Patent Application No. No. 374770 [11 to].

[0025] Passage partial 4a of the wire harness 4 drawn from the harness fixed part 16 is connected to the wire harness 8 by the side of the car body by the connectors 17 and 31 of a male and a female by the outlet side of a box 7 through the inside of a box 7.

[0026] The box 7 is being horizontally fixed to the back end side of the step section 6 of the car body 5 in the condition of every width (every Taira). As shown also in drawing 2, a box 7 is preferably made from synthetic resin, when reinforcement is required, it is formed [stepping on on foot, etc. and] in the shape of [liable to flat] a rectangle stereo by being made from a metal, and consists of an upper wall (covering device) 18 (drawing 1) of the rectangle near a square thru/or a square, each walls 19-22 with the low height of front and rear, right and left, and a bottom wall 23 (drawing 2) that counters an upper wall 18.

[0027] Notching formation of the opening 25 for harness installation is carried out at the wall 21 (drawing 2) on the left-hand side of the box 7 which counters a slide door 1, and notching formation of the opening 27 for harness derivation is carried out at the wall 20 on the backside [the box 7 joined to the posterior wall of stomach 26 of the step section 6 (drawing 1)], i.e., the left-hand side wall 21 and the wall which intersects perpendicularly. The opening 27 for harness derivation is mostly located on the diagonal line with the opening 25 for harness installation. The loop-formation section 28 of wire harness 4 is horizontally located in a box 7.

[0028] the opening 25 for harness installation -- setting -- wire harness 4 -- almost -- truth -- direct induction part 4b can move freely to the interior and the exterior of a box 7 like an arrow head c, without spoiling freedom in any way. The wire harness 4 introduced in the box 7 is rolled one in the shape of a loop formation, and is carried out in the space 29 of the shape of a rectangle in a box 7, and partial 4c which curved in the shape of radii a little following the loop-formation section 28 is being fixed to the inside of the wall 20 on the right-hand side of a box 7 with the second clip (holddown member) 30 [near the opening 27 for harness derivation]. The connector 17 for connecting with the wire harness 8 (drawing 1) by the side of the car body on the outside of opening 27 is formed in 4d of derivation parts of wire harness 4.

[0029] In a box 7, any structures other than the second clip 30 are not prepared, but structure is simplified extremely. in addition, it is also possible to protrude the boss section (not shown) for carrying out location appearance of the core of the loop-formation section 28 of wire harness 4 to the bottom wall 23 or upper wall 18 (drawing 1) of a box 7, and making it.

[0030] Curve formation of the second clip 30 is carried out by resin shaping at a box 7 and one at the shape of an abbreviation semicircle, lower limit 30b has a clearance between the insides of a wall 22 following one in the inside of the wall 22 of a box 7, and bending [facing up] is inside possible for upper limit 30a. Wire harness 4 is inserted inside the

second clip 30 from the clearance which carried out opening greatly where the second clip 30 is sagged on the direction outside of a path.

[0031] Structure is low-cost[simplification and]-ized by carrying out resin shaping of the second clip 30 at a box 7 and one. The opening 27 for harness derivation serves also as the mold omission hole at the time of clip shaping.

[0032] In addition, the second clip 30 is formed in another object with synthetic resin or a metal in a box 7, and you may make it fix to a box 7 by **** etc. In this case, the configuration of the second clip 30 may consist of a part which curved in the approximate circle configuration, and a fixed portion following a part for a bend like the first clip 9 (drawing 1). Moreover, the second clip 30 may be formed in the wall 19 by the side of before a box 7, and the opening 27 for harness derivation may be formed in the wall 22 on the right-hand side of a box 7.

[0033] As for the upper wall (covering device) 18 (drawing 1) of a box 7, it is desirable to make closing motion free, it is also possible to form a upper wall 18 in which the vertical walls 19-22 and one through the hinge of for example, thin meat, and it is possible to also make it stop with a stop means (not shown) by which a upper wall 18 is said to a wall with an opposite hinge as a stop projection and the piece of an engagement frame in that case.

[0034] Moreover, it is also possible to eliminate the bottom wall 23 of a box 7 and to serve as a bottom wall 23 in respect of the upper wall of the step section 6 (drawing 1). Moreover, it is possible to open the walls 19 and 21, to incurvate wire harness 4 in the shape of a loop formation, to set [enable closing motion of walls other than a upper wall (for example, walls 19 and 21 of a before side or left-hand side),] in a box 7, and to also make a connector 17 draw from the harness derivation section 27.

[0035] Moreover, it is also possible to form a box 7 in the step section 6 and one. In this case, as for at least one wall (it does not restrict to a upper wall 18) of a box 7, it is desirable for it to be able to open and close. the object for harness installation, and the openings 25 and 27 for derivation -- almost -- a vertical angle -- or it cannot be overemphasized that it prepares face to face.

[0036] Also in the box of which gestalt, the tooth space in the rectangle-like box 7 can be effectively used by forming mostly the object for harness installation, and the openings 25 and 27 for derivation on the diagonal line. That is, partial 4b by the side of installation of wire harness 4 is located in one corner of a box 7, partial 4c by the side of derivation of wire harness 4 is located in the corner of another side of a box 7, and the diameter of the loop-formation section 28 of wire harness 4 is expanded using the maximum in space other than four corners of a box 7. Chain-line 28' shows the diameter reduction condition of the loop-formation section 28 by drawing 2 .

[0037] Moreover, it is also possible to arrange a box 7 in the back end side of the step section 6 every (perpendicular) length in drawing 1 . Said level bottom wall 23 (drawing 2) turns into a perpendicular front wall, said perpendicular front wall 19 turns into a level upper wall, in this case, said level upper wall 18 of a box 7 joins to the perpendicular back end wall 26 of the step section 6, it becomes a perpendicular posterior wall of stomach, and the perpendicular walls 21 and 22 on either side turn into [said perpendicular posterior wall of stomach 20 turns into a level bottom wall, and] a perpendicular wall on either side which started. The loop-formation section 28 of wire harness 4 is perpendicularly located in a box 7.

[0038] carrying out a box 7 every length -- the effective area of the step section 6 -- increasing (a step side being expanded) -- the opening 25 for harness installation becomes the almost same height as a guide rail 2, and the slack of wire harness 4 is suppressed further from a guide rail 2 before a box 7.

[0039] Like drawing 1 , by having incurvated the wire harness 4 by the side of the slide door which continues to the wire harness 8 by the side of guide-rail 2 empty-vehicle both the bodies in the shape of a loop formation, and having held it in the box 7 by the side of the step section, the slack of the wire harness 4 at the time of closing motion of a slide door 1 is absorbed in a box 7, and an insert lump of the wire harness 4 of a between [a slide door 1 and the car bodies 5] is prevented.

[0040] Moreover, a guide rail 2 can be shortened by the diameter of the loop-formation section 28 of the wire harness 4 in a box 7 being reduced at the time of the close by-pass bulb completely of a slide door 1, and wire harness 4 being extended, and lightweight-izing and low-cost-izing of a guide rail 2, shortening of the wire harness 4 from the first clip 9 to a slider 3, and the fall that flusters are possible.

[0041] That is, in drawing 1 , a slide door 1 is in the condition of a half-aperture, and the wire harness 4 by the side of a slide door is held in the shape of a loop formation with the big path in the box 7. It follows on making a slide door 1 slide back like an arrow head a, and opening it from this condition. A guide rail 2 retreats to a slide door 1 and one, and the slider 3 which fixed wire harness 4 moves back for a while by frictional force with a guide rail 2. Under the present circumstances, the wire harness 4 of the moved die length of a slider 3 makes the diameter of the loop-formation section 28 in a box 7 reduce a little, and lets out from a box 7. **** of wire harness 4 is prevented by that cause, and, subsequently to front end 13a of the guide hole 13 of a guide rail 2, a slider 3 runs. Wire harness 4 is pulled, from a box 7

the diameter of the loop-formation section 28 of wire harness 4 is reduced by it, and it lets out to like [of drawing 2 / chain-line 28'] by it.

[0042] Thereby, it is prevented by wire harness 4 at the time of aperture actuation of a slide door 1 that impossible tensile force acts. Moreover, since wire harness 4 is held between a slide door 1 and the car body 5 at the condition (condition not slackening) of having always stretched with the pin mostly, it is prevented that passage partial 4a of wire harness 4 is put between the lower limits 32 and the car bodies 5 of a slide door 1. Moreover, since what is necessary is just to locate the front end section of a guide rail 2 in the longitudinal direction pars intermedia instead of the front end side of a slide door 1, the degree of freedom of arrangement of a functional part increases in the first half side of a slide door 1.

[0043] Following on making a slide door 1 slide ahead like an arrow head b from the full open condition of a slide door 1 and closing, a guide rail 2 moving forward to a slide door 1 and one, and a slider 3 moving forward by frictional force with a guide rail 2 Wire harness 4 is sent in in a box 7, and is rolled in the shape of a loop formation. When the diameter of the loop-formation section 28 is expanded gradually and a slider 3 and a box 7 are located in the minimum distance, the path of the loop-formation section 28 serves as max. When follow on a slider 3 being lengthened ahead, the loop-formation section 28 reduces the diameter gradually, wire harness 4 is pulled out from a box 7 and elongation and a slider 3 run against back end 13b of the guide hole 13 The loop-formation section 28 reduces the diameter greatly, and wire harness 4 lets out from a box 7.

[0044] It is prevented that tensile force with wire harness 4 impossible for acts by this at the time of closing actuation of a slide door 1. Moreover, since wire harness 4 is held between a slide door 1 and the car body 5 at the condition (condition not slackening) of having always stretched with the pin mostly, it is prevented that wire harness 4 is put between the lower limits 32 and the car bodies 5 of a slide door 1. Moreover, since a twist is also large and the back end section of a guide rail 2 can be located in the back end section of a slide door 1 to the front, the degree of freedom of arrangement of the functional part in the back end section of a slide door 1 increases.

[0045] Moreover, following on making a slide door 1 slide to back from a close-by-pass-bulb-completely condition, and opening it, a guide rail 2 retreating to a slide door 1 and one, and a slider 3 retreating by frictional force with a guide rail 2, wire harness 4 is rounded in a box 7, is gradually rolled in the shape of a loop formation, slack is absorbed, and when a slider 3 and a box 7 are located in the minimum distance, the path of the loop-formation section 28 serves as max. The loop-formation section 28 reducing the diameter gradually like the above-mentioned, it lets out from a box 7 and impossible **** of wire harness 4 is prevented by the back.

[0046] In addition, although the guide rail 2 was formed in the slide door side in the above-mentioned operation gestalt and the box 7 was established in the car body side, this thing [forming a guide rail 2 in a car body side conversely, and establishing a box 7 in a slide door side] is also possible. In this case, the wire harness 8 by the side of the car body is fixed to a slider 3, and the wire harness 8 by the side of the car body is held in the shape of a loop formation in a box 7. pass a slider 3 and the first fixed part (clip) 9 from a box 7 in the wire harness 8 by the side of a slide door -- it is also possible to **** to a connector 11 and to carry out the connector joint of the wire harness 4 by the side of a slide door to connector 11.

[0047] Moreover, it is also possible to arrange a box 7 behind parts 26 other than the step section of the car body 5, for example, the back end wall of the step section 6. Moreover, the number of turns of the loop-formation section 28 of said wire harness 4 can also be carried out to not 1 volume but two rolls thru/or more than it. Moreover, a slider 3 runs against front end (end) 13a of the guide slot 13 of a guide rail 2 before full open of a slide door 1, and/or it is also possible to adjust the die length and the location of a guide rail 2 so that a slider 3 may run against back end (other end) 13b of the guide slot 13 in front of the close by-pass bulb completely of a slide door 1.

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CLAIMS

[Claim(s)]

[Claim 1] Prepare a guide rail in a slide door and a slider is made it to engage with this guide rail free [a slide]. In the electric supply structure of a slide door where fixed the longitudinal direction pars intermedia of wire harness to this slider, ****(ed) one side of this wire harness to this slide door side, and another side of this wire harness was ****(ed) to the car body side A box is established in said car body side, and in this box, said wire harness between said slider and this car body is rolled in the shape of a loop formation, and is held. Electric supply structure of the slide door characterized by the slack of this wire harness between this slider and this car body being absorbed by expanding and contracting of the loop-formation section of the wire harness in this box.

[Claim 2] Electric supply structure of the slide door according to claim 1 characterized by said slider contacting the end section of said guide rail before full open of said slide door.

[Claim 3] Electric supply structure of the slide door according to claim 1 or 2 characterized by said slider contacting the other end of said guide rail in front of the close by-pass bulb completely of said slide door.

[Claim 4] Electric supply structure of a slide door given in any of claims 1-3 characterized by fixing the part following loop-formation section empty vehicle both the bodies side of said wire harness in said box they are.

[Claim 5] Electric supply structure of a slide door given in any of claims 1-4 characterized by arranging said box in the step section of said car body they are.

[Claim 6] Electric supply structure of a slide door given in any of claims 1-3 characterized by said guide rail having replaced with said slide door, and having been prepared in said car body side, and for said box having replaced with said car body, and establishing it in said slide door side they are.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing 1 operation gestalt of the electric supply structure of the slide door concerning this invention.

[Drawing 2] It is the perspective view showing the condition of similarly having held wire harness in the shape of a loop formation in the box.

[Drawing 3] One gestalt of the electric supply structure of the conventional slide door is shown, and it is (a). It is (b) at the time of a slide door close by-pass bulb completely. It is the cross-sectional view showing the condition at the time of slide door full open.

[Description of Notations]

- 1 Slide Door
- 2 Guide Rail
- 3 Slider
- 4 Wire Harness
- 5 Car Body
- 6 Step Section
- 7 Box
- 28 Loop-Formation Section

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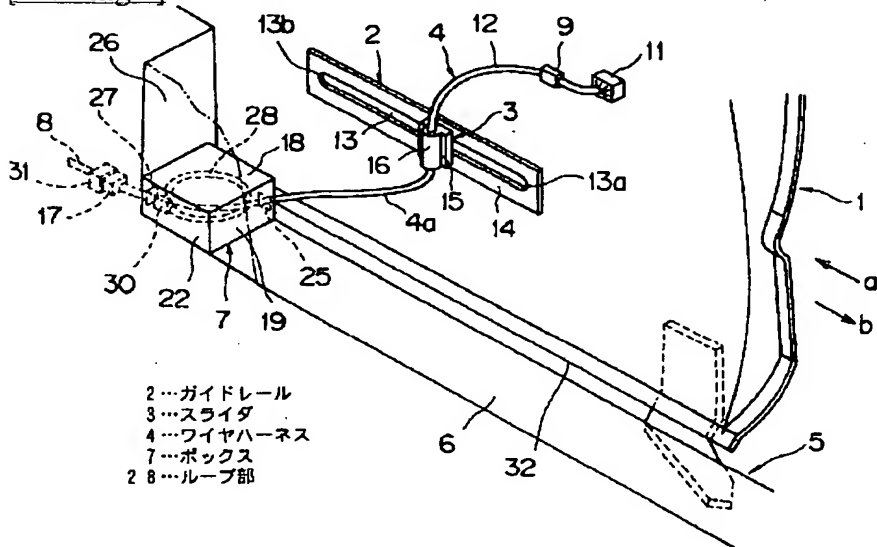
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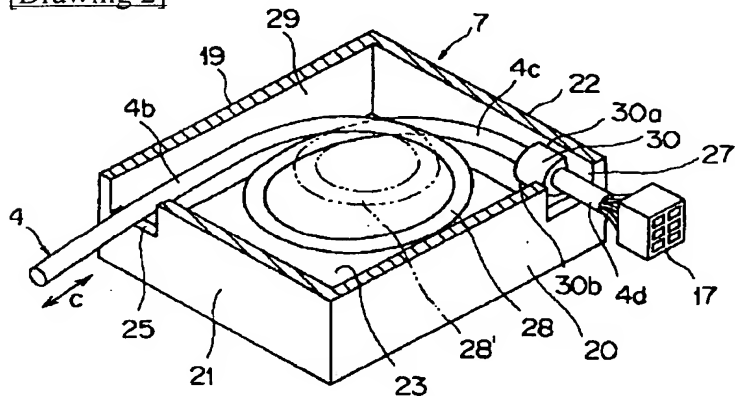
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DRAWINGS

[Drawing 1]

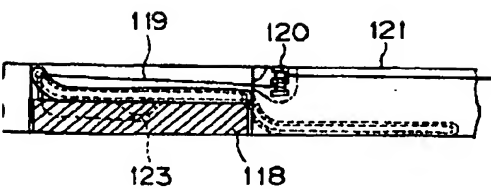


[Drawing 2]

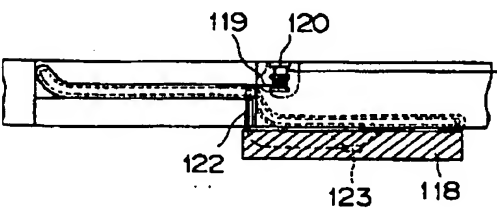


[Drawing 3]

(a)



(b)



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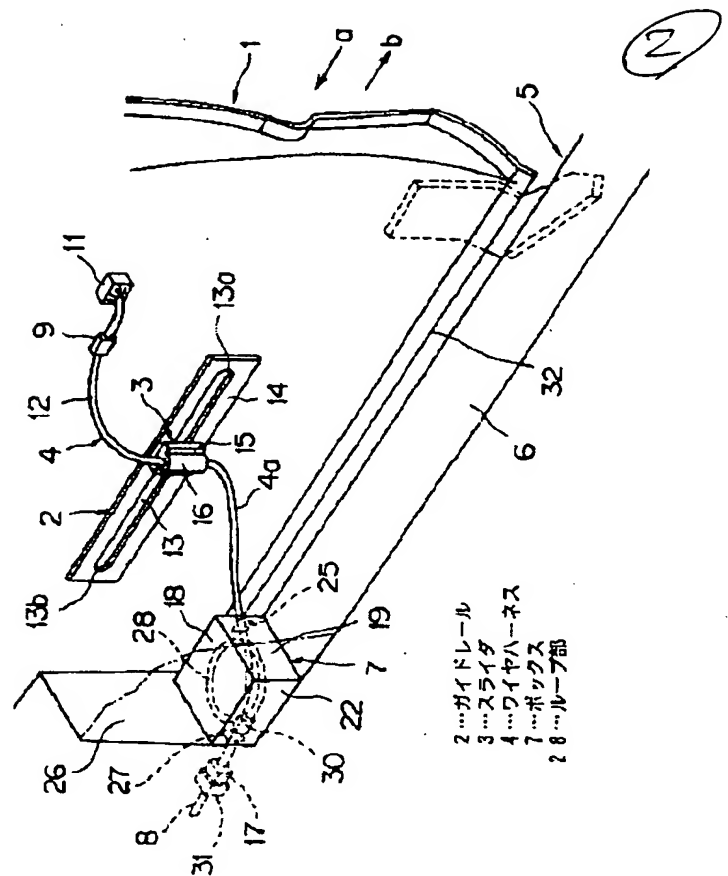
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 APPLICATION NUMBER : 2000182715

APPLICANT : YAZAKI CORP;

INVENTOR : WATABE HIROSHI;

INT.CL. : B60J 5/06 B60R 16/02

TITLE : POWER SUPPLY STRUCTURE FOR
 SLIDE DOOR



ABSTRACT : PROBLEM TO BE SOLVED: To allow a wire harness provided between a slide door and a motor vehicle body to absorb its looseness and ease its tension, easily and securely.

SOLUTION: A slide door 1 is provided with a guide rail 2 to which a slider 3 is jointed, and a middle part of the length of a wire harness 4 is fixed to the slider 3. One end of the wire harness is led to the slide door side, and the other end of the slide door is led to the motor vehicle body side where a box 7 is provided on a step 6 of a motor vehicle body 5, wherein the wire harness 4 between the slider 3 and the motor vehicle body 5 is wound up in loop shape to be contained in the box. The wire harness loop 28 in the box extends or contracts to absorb a looseness of the wire harness between the slider and the motor vehicle body. Upon full opening of the slide door 1, the slider 3 is to be pushed to the one end of a guide rail 2, while, upon full closing of the slide door 1, the slider 3 is to be pushed to the other end of the guide rail 2.

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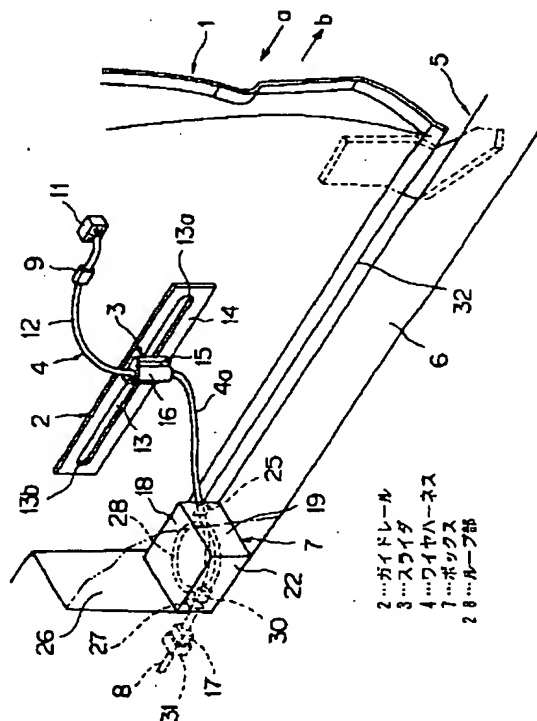
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(54)【発明の名称】 スライドドアの給電構造

(57)【要約】

【課題】 スライドドアと車両ボディとの間のワイヤハーネスの弛みの吸収と引張の緩和を簡単且つ確実にに行わせる。

【解決手段】 スライドドア1にガイドレール2を設け、ガイドレールに係合したスライダ3にワイヤハーネス4の長手方向中間部を固定し、ワイヤハーネスの一方をスライドドア側に配索し、他方を車両ボディ側に配索し、車両ボディ側にボックス7を設け、スライダ3と車両ボディ5との間におけるワイヤハーネス4をボックス内にループ状に巻いて収容し、ボックス内のワイヤハーネスのループ部28の拡張によりスライダと車両ボディとの間におけるワイヤハーネスの弛みを吸収する。スライドドア1の全開前にスライダ3をガイドレール2の一端部に当接させる。スライドドア1の全閉前にスライダ3をガイドレール2の他端部に当接させる。ボックス7を車両ボディ5のステップ部6に配設する。



【特許請求の範囲】

【請求項 1】 スライドドアにガイドレールを設け、該ガイドレールにスライダをスライド自在に係合させ、該スライダにワイヤハーネスの長手方向中間部を固定し、該ワイヤハーネスの一方を該スライドドア側に配索し、該ワイヤハーネスの他方を車両ボディ側に配索したスライドドアの給電構造において、

前記車両ボディ側にボックスが設けられ、前記スライダと該車両ボディとの間における前記ワイヤハーネスが該ボックス内にループ状に巻かれて収容され、該ボックス内のワイヤハーネスのループ部の拡張により該スライダと該車両ボディとの間における該ワイヤハーネスの弛みが吸収されることを特徴とするスライドドアの給電構造。

【請求項 2】 前記スライドドアの全開前に前記スライダが前記ガイドレールの一端部に当接することを特徴とする請求項 1 記載のスライドドアの給電構造。

【請求項 3】 前記スライドドアの全閉前に前記スライダが前記ガイドレールの他端部に当接することを特徴とする請求項 1 又は 2 記載のスライドドアの給電構造。

【請求項 4】 前記ワイヤハーネスのループ部から車両ボディ側に続く部分が前記ボックス内で固定されたことを特徴とする請求項 1～3 の何れかに記載のスライドドアの給電構造。

【請求項 5】 前記ボックスが前記車両ボディのステップ部に配設されたことを特徴とする請求項 1～4 の何れかに記載のスライドドアの給電構造。

【請求項 6】 前記ガイドレールが前記スライドドアに代えて前記車両ボディ側に設けられ、前記ボックスが前記車両ボディに代えて前記スライドドア側に設けられたことを特徴とする請求項 1～3 の何れかに記載のスライドドアの給電構造。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】 本発明は、自動車のスライドドアと車両ボディとの間にワイヤハーネスを配索してスライドドアへの常時給電を行う構造におけるワイヤハーネスの弛みを吸収可能としたスライドドアの給電構造に関するものである。

【0002】

【従来の技術】 ワンボックスカーやワゴン車等に使用されるスライドドアの各機能部品に車両ボディ側（電源側）から電気を供給したり、スライドドア側から車両ボディ側に電気信号を送ったりするために、従来種々の給電構造が提案されている。

【0003】 スライドドアにはパワーウィンドモータやドアロックユニットやスピーカやスイッチユニットあるいは電子制御ユニットといった種々の機能部品が搭載されている。これら機能部品に対して電源電流や信号電流を供給しないし受給するわけであるが、スライドドアを閉

めた場合は勿論のこと、開けた場合においてもこれらの給電・受電が必要となっている。

【0004】 図 3 (a) (b) は、特開平 7-22274 号公報に記載された従来のスライドドアの給電構造の一形態を示すものである。

【0005】 この構造は、スライドドア 118 の開閉動作に伴って電線（ワイヤハーネス） 119 を繰り出し・巻き取り可能なリール 120 が車両ボディ 121 側に設けられ、電線 119 の一端側がヒンジ 122 を介してドア側の機能部品であるスピーカ 123 に接続され、電線 119 の他端側が車両ボディ側の機能部品であるオーディオ（図示せず）に接続されている。

【0006】 図 3 (a) のスライドドア 118 の閉時において電線 119 はリール 120 から繰り出されて延び、図 3 (b) のスライドドアの開時において電線 119 はリール 120 に巻き取られる。

【0007】

【発明が解決しようとする課題】 しかしながら、上記構造にあっては、電線をリールに幾重にも巻き取らなければならないために、電線が傷みやすいという懸念があった。また、回路数の多いワイヤハーネスでは屈曲性が悪いために適用が困難であるという問題があった。

【0008】 これらの問題を解消すべく、本出願人は先に特願平 11-374770 号において、スライドドアの水平方向のガイドレールを設け、ガイドレールにスライダをスライド自在に係合させ、スライダにスライドドア側のワイヤハーネスを固定し、スライダから車両ボディ側のワイヤハーネスのコネクタ接続部にかけてスライドドア側のワイヤハーネスを略 U 字状に湾曲させて、スライドドアの開閉時のスライドドア側のワイヤハーネスの引張力等を吸収させるスライドドアの給電構造（図示せず）を提案した。

【0009】 しかしながら、この構造にあっては、スライドドアと車両ボディとの間でワイヤハーネスを湾曲させている関係で、ワイヤハーネスが弛みやすく、スライドドアと車両ボディとの間に挟み込まれやすいという懸念があった。また、スライドドアの開閉時におけるワイヤハーネスの弛みを吸収させるべく、スライドドアのほぼ全長に渡る長いガイドレールを用いているために、ガイドレールの大型化による重量増やスライドドア側の機能部品等の配置の自由度が制限される等の問題があった。

【0010】 本発明は、上記した各点に鑑み、スライドドアと車両ボディとの間にワイヤハーネスが挟まれる心配がなく、また、ガイドレールの大型化を防止できて、重量増やスライドドア側の機能部品等の配置の自由度の制限を解消できるスライドドアの給電構造を提供することを目的とする。

【0011】

【課題を解決するための手段】 上記目的を達成するため

に、本発明は、スライドドアにガイドレールを設け、該ガイドレールにスライダをスライド自在に係合させ、該スライダにワイヤハーネスの長手方向中間部を固定し、該ワイヤハーネスの一方を該スライドドア側に配索し、該ワイヤハーネスの他方を車両ボディ側に配索したスライドドアの給電構造において、前記車両ボディ側にボックスが設けられ、前記スライダと該車両ボディとの間における前記ワイヤハーネスが該ボックス内にループ状に巻かれて収容され、該ボックス内のワイヤハーネスのループ部の拡張により該スライダと該車両ボディとの間における該ワイヤハーネスの弛みが吸収されることを特徴とする（請求項１）。前記スライドドアの全開前に前記スライダが前記ガイドレール的一端部に当接することも有効である（請求項２）。また、前記スライドドアの全閉前に前記スライダが前記ガイドレールの他端部に当接することも有効である（請求項３）。また、前記ワイヤハーネスのループ部から車両ボディ側に続く部分が前記ボックス内で固定されたことも有効である（請求項４）。また、前記ボックスが前記車両ボディのステップ部に配設されたことも有効である（請求項５）。また、前記ガイドレールが前記スライドドアに代えて前記車両ボディ側に設けられ、前記ボックスが前記車両ボディに代えて前記スライドドア側に設けられたことも有効である（請求項６）。

【 0 0 1 2 】

【発明の実施の形態】以下に本発明の実施の形態を図面を用いて詳細に説明する。図1は、本発明に係るスライドドアの給電構造の一実施形態を示すものである。

【0013】この構造は、スライドドア1に水平方向の短めのガイドレール2を設け、ガイドレール2にスライダ3をスライド自在に係合させ、スライダ3にスライドドア側のワイヤハーネス4の長手方向中間部を固定し、車両ボディ5のステップ部6においてボックス7内にスライドドア側のワイヤハーネス4の先端側すなわち車両ボディ側のワイヤハーネス8との接続側をループ状に收容して、スライドドア1と車両ボディ5との間におけるスライドドア側のワイヤハーネス4の弛みをなくした（吸収した）ことを特徴とするものである。

【0014】スライドドア側のワイヤハーネス4の基端側は第一のクリップ（固定部材）9でスライドドア1のパネル10の表面に固定され、基端側のコネクタ11がスライドドア内の機能部品（図示せず）に接続される。コネクタ11はスライドドア内に導入されていてもよい。

【0015】ワイヤハーネス4は複数本の電線をビニルテープで巻いて構成されている。ビニルテープの巻き方は間隔を開けて荒く巻いても、間隔を開けずに密に巻いてもどちらでもよい。ワイヤハーネス4として一本のキャブタイヤケーブルを用いることも可能である。また、合成樹脂製の屈伸自在なコルゲートチューブ（図示せ

ず)の内部に複数本の電線を挿通させてワイヤハーネスを構成させてもよい。

【0016】第一のクリップ9とスライド3との間でワイヤハーネス4にはゆとり（余長）12がもたされている。このゆとり12は例えばスライドドア1の全開状態で最大となり（図1の状態ではスライドドア1は半開きとなっている）、スライドドア1の全閉状態で最小ないしはゼロになるように設定されている。

【0017】第一のクリップ9は例えば合成樹脂を材料として略円形状に湾曲した部分（図示せず）と、湾曲部分に続く固定部分（図示せず）とで構成され、固定部分は可撓性の一對の傘状の係止部（図示せず）を有し、係止部はスライドドア1のパネル10の孔（図示せず）に挿入されて係合する。

【0018】なお、湾曲部分に代えて板状の部分を形成し、板状の部分にワイヤハーネス4をビニルテープで巻回固定してもよい。また、固定部分を板状に形成し、係止部に代えてボルト挿通孔を設け、固定部分をボルトでパネルに締付固定してもよい。また、第一のクリップ9をスライドドア1の合成樹脂製ないし金属製のパネル10と一体にフック状に形成してもよい。

【0019】いずれにせよ、ワイヤハーネス4を第一のクリップ9でスライドドア1に位置ずれなく固定して、スライドドア開閉時にコネクタ11に引張力が作用しないようにすることが必要である。

【0020】スライドドア1の開閉時にワイヤハーネス4は第一のクリップ9とスライダ3との間で前後に揺動する。これはスライダ3がガイドレール2に沿って相対的に前後方向に移動するからに他ならない。

【0021】スライドドア1の開き操作でガイドレール2はスライドドア1と一体に後退し、スライダ3はガイドレール2との摩擦でやや後方に引かれつつほぼ定位置に留まり、スライダ3がガイドレール2のガイド孔13の前端13aに当接する。また、スライドドア1の閉じ操作でガイドレール2はスライドドア1と一体に前進し、スライダ3はガイドレール2との摩擦でやや前方に引かれつつほぼ定位置に留まり、スライダ3がガイド孔13の後端13bに当接する。これらの作用については後で詳細に説明する。

【0022】ガイドレール2はスライドドア1の下端部寄りで且つスライドドア1の後半部側に配置されている。このガイドレール2の長さは例えばスライドドア1の長さの $1/2 \sim 2/3$ 程度と短く設定されている。

【００２３】ガイドレール２は合成樹脂又は金属を材料として、横長矩形状の板部１４と、板部１４の高さ方向中央に設けられたスリット状（長孔状）のガイド孔１３とで構成されている。板部１４はスライドドア１のパネル１０に固定され、ガイド孔１３は、パネル１０に設けた長孔（図示せず）に続くか、あるいは板部１４を支柱（図示せず）でパネル１０に固定することで、板部１４

の裏側の空間に続いている。

【0024】スライダ3は、ガイドレール2の板部14の表面に摺接する基板部15と、基板部15からガイド孔13内に突出した軸部（図示せず）と、軸部の先端に設けられ、ガイドレール2の裏側に摺接する鏝部（図示せず）と、基板部15の表側に設けられたハーネス固定部16とで構成されている。ハーネス固定部16は半環状に形成され、例えばハーネス固定部16を一体に有する板部（図示せず）を基板部15にボルトで固定することで、ワイヤハーネス4がハーネス固定部16と基板部15との間で挟持固定される。これらガイドレール2やスライダ3の構造は先の特願平11-374770号で提案済である。

【0025】ハーネス固定部16から導出されたワイヤハーネス4の渡り部分4aはボックス7内を経てボックス7の出口側で車両ボディ側のワイヤハーネス8に雄・雌のコネクタ17、31で接続されている。

【0026】ボックス7は車両ボディ5のステップ部6の後端側において水平に横置き（平置き）の状態で固定されている。ボックス7は図2にも示す如く、好ましくは合成樹脂を材料として、足で踏まれる等で強度が必要な場合は金属を材料として、偏平気味の矩形立体状に形成され、正方形ないし正方形に近い長方形の上壁（蓋部）18（図1）と、前後左右の高さの低い各壁部19～22と、上壁18に対向する底壁23（図2）とで構成されている。

【0027】スライドドア1に対向するボックス7の左側の壁部21（図2）にハーネス導入用の開口25が切欠形成され、ステップ部6（図1）の後壁26に接合するボックス7の後側の壁部20、すなわち左側の壁部21と直交する壁部にハーネス導出用の開口27が切欠形成されている。ハーネス導出用の開口27はハーネス導入用の開口25とほぼ対角線上に位置している。ボックス7内でワイヤハーネス4のループ部28は水平に位置する。

【0028】ハーネス導入用の開口25においてワイヤハーネス4のほぼ真直な導入部分4bは何ら自由を損なうことなく矢印cの如くボックス7の内部及び外部に進退自在である。ボックス7内に導入されたワイヤハーネス4はボックス7内の矩形状の空間29でループ状に一巻きされ、ループ部28に続く若干円弧状に湾曲した部分4cがハーネス導出用の開口27の近傍においてボックス7の右側の壁部20の内面に第二のクリップ（固定部材）30で固定されている。ワイヤハーネス4の導出部分4dには開口27の外側において車両ボディ側のワイヤハーネス8（図1）と接続するためのコネクタ17が設けられている。

【0029】ボックス7内には第二のクリップ30以外の構造物を設けておらず、構造が極めて簡素化されている。なお、ボックス7の底壁23又は上壁18（図1）

に、ワイヤハーネス4のループ部28の中心を位置出するためのボス部（図示せず）を突設することも可能である。

【0030】第二のクリップ30は例えばボックス7と一体に樹脂成形により略半円状に湾曲形成され、上端30aがボックス7の壁部22の内面に一体に続き、下端30bが壁部22の内面との間に隙間を有して、上向きに撓み可能である。第二のクリップ30を径方向外側に撓ませた状態で大きく開口した隙間からワイヤハーネス4が第二のクリップ30の内側に挿入される。

【0031】第二のクリップ30をボックス7と一体に樹脂成形することで、構造が簡素化・低コスト化される。ハーネス導出用の開口27はクリップ成形時の型抜き孔をも兼ねている。

【0032】なお、第二のクリップ30をボックス7とは別体に合成樹脂又は金属で形成して、ねじ等でボックス7に固定するようにしてもよい。この場合、第二のクリップ30の形状は第一のクリップ9（図1）と同様に、略円形状に湾曲した部分と、湾曲部分に続く固定部分とで構成されていてもよい。また、第二のクリップ30をボックス7の前側の壁部19に設け、ハーネス導出用の開口27をボックス7の右側の壁部22に設けてもよい。

【0033】ボックス7の上壁（蓋部）18（図1）は開閉自在にすることが好ましく、上壁18を例えば薄肉のヒンジを介して垂直方向の何れかの壁部19～22と一体に形成することも可能であり、その場合、上壁18をヒンジとは反対の壁部に係止突起と係合枠片というような係止手段（図示せず）で係止させることも可能である。

【0034】また、ボックス7の底壁23を排除して、ステップ部6（図1）の上壁面で底壁23を兼ねるようにすることも可能である。また、上壁以外の壁部（例えば前側又は左側の壁部19、21）を開閉自在として、その壁部19、21を開けてボックス7内にワイヤハーネス4をループ状に湾曲させてセットし、ハーネス導出部27からコネクタ17を導出させることも可能である。

【0035】また、ボックス7をステップ部6と一体に形成することも可能である。この場合、ボックス7の少なくとも一つの壁部（上壁18に限らない）は開閉可能であることが好ましい。ハーネス導入用及び導出用の開口25、27をほぼ対角に又は対向して設けることは言うまでもない。

【0036】何れの形態のボックスにおいても、ハーネス導入用及び導出用の開口25、27をほぼ対角線上に設けることで、矩形状のボックス7内のスペースを有効に使うことができる。すなわち、ボックス7の一方の角部にワイヤハーネス4の導入側の部分4bが位置し、ボックス7の他方の角部にワイヤハーネス4の導出側の部

分 4 c が位置し、ボックス 7 の四つの角部以外の空間を最大限に使ってワイヤハーネス 4 のループ部 28 が拡張される。図 2 で鎖線 28' はループ部 28 の縮径状態を示す。

【0037】また、図 1 においてボックス 7 をステップ部 6 の後端側に縦置き（垂直）に配設することも可能である。この場合、例えばステップ部 6 の垂直な後端壁 26 にボックス 7 の前記水平な上壁 18 が接合して垂直な後壁となり、前記水平な底壁 23（図 2）が垂直な前壁となり、前記垂直な前壁 19 が水平な上壁となり、前記垂直な後壁 20 が水平な底壁となり、左右の垂直な壁部 21, 22 が左右の垂直な立ち上がった壁部となる。ボックス 7 内でワイヤハーネス 4 のループ部 28 は垂直に位置する。

【0038】ボックス 7 を縦置きにすることで、ステップ部 6 の有効面積が増大する（ステップ面が拡大される）と共に、ハーネス導入用の開口 25 がガイドレール 2 とほぼ同じ高さになり、ガイドレール 2 からボックス 7 までの間でワイヤハーネス 4 の弛みが一層抑えられる。

【0039】図 1 の如く、ガイドレール 2 から車両ボディ側のワイヤハーネス 8 へ続くスライドドア側のワイヤハーネス 4 をステップ部側のボックス 7 内にループ状に湾曲させて収容したことで、スライドドア 1 の開閉時におけるワイヤハーネス 4 の弛みがボックス 7 内で吸収され、スライドドア 1 と車両ボディ 5 との間へのワイヤハーネス 4 の挟み込みが防止される。

【0040】また、スライドドア 1 の全閉時にボックス 7 内のワイヤハーネス 4 のループ部 28 が縮径されてワイヤハーネス 4 が伸びることで、ガイドレール 2 を短く

することができ、ガイドレール 2 の軽量化・低コスト化と、第一のクリップ 9 からスライダ 3 までのワイヤハーネス 4 の短縮化とばたつきの低下が可能となっている。

【0041】すなわち、図 1 においてスライドドア 1 は半開きの状態にあり、ボックス 7 内にはスライドドア側のワイヤハーネス 4 が大きな径でループ状に収容されている。この状態からスライドドア 1 を矢印 a の如く後方にスライドさせて開けるに伴って、ガイドレール 2 がスライドドア 1 と一体に後退し、ワイヤハーネス 4 を固定したスライダ 3 がガイドレール 2 との摩擦力で少し後方に移動し、この際、スライダ 3 の移動分の長さのワイヤハーネス 4 がボックス 7 内のループ部 28 をやや縮径させてボックス 7 から繰り出され、それによりワイヤハーネス 4 の引張が防止され、次いでスライダ 3 がガイドレール 2 のガイド孔 13 の前端 13 a に突き当たり、それによってワイヤハーネス 4 が引っ張られて、ボックス 7 からワイヤハーネス 4 のループ部 28 が図 2 の鎖線 28' の如くさらに縮径されて繰り出される。

【0042】これにより、スライドドア 1 の開き操作時にワイヤハーネス 4 に無理な引張力が作用することが防

止される。また、スライドドア 1 と車両ボディ 5 との間でワイヤハーネス 4 が常にほぼピンと張った状態（弛まない状態）に保持されるから、スライドドア 1 の例えば下端 32 と車両ボディ 5 との間にワイヤハーネス 4 の渡り部分 4 a が挟み込まれることが防止される。また、ガイドレール 2 の前端部をスライドドア 1 の前端側ではなく長手方向中間部に位置させればよいから、スライドドア 1 の前半側において機能部品の配置の自由度が高まる。

【0043】スライドドア 1 の全開状態からスライドドア 1 を矢印 b の如く前方にスライドさせて閉じるに伴って、ガイドレール 2 がスライドドア 1 と一体に前進し、スライダ 3 がガイドレール 2 との摩擦力で前進しつつ、ワイヤハーネス 4 がボックス 7 内に送り込まれてループ状に巻かれて、徐々にループ部 28 が拡張され、スライダ 3 とボックス 7 とが最短距離に位置した時点でループ部 28 の径が最大となり、スライダ 3 が前方に引かれるに伴ってループ部 28 が徐々に縮径してワイヤハーネス 4 がボックス 7 から引き出されて伸び、スライダ 3 がガイド孔 13 の後端 13 b に突き当たった時点で、ループ部 28 が大きく縮径してワイヤハーネス 4 がボックス 7 から繰り出される。

【0044】これにより、スライドドア 1 の閉じ操作時に、ワイヤハーネス 4 に無理な引張力が作用することが防止される。また、スライドドア 1 と車両ボディ 5 との間でワイヤハーネス 4 が常にほぼピンと張った状態（弛まない状態）に保持されるから、スライドドア 1 の例えば下端 32 と車両ボディ 5 との間にワイヤハーネス 4 が挟み込まれることが防止される。また、ガイドレール 2 の後端部をスライドドア 1 の後端部により大きく手前に位置させることができるから、スライドドア 1 の後端部における機能部品の配置の自由度が高まる。

【0045】また、スライドドア 1 を全閉状態から後方にスライドさせて開けるに伴って、ガイドレール 2 がスライドドア 1 と一体に後退し、スライダ 3 がガイドレール 2 との摩擦力で後退しつつ、ワイヤハーネス 4 がボックス 7 内に繰り込まれて徐々にループ状に巻かれて弛みを吸収し、スライダ 3 とボックス 7 とが最短距離に位置した時点でループ部 28 の径が最大となる。後は前述の如くループ部 28 が徐々に縮径しつつボックス 7 から繰り出されてワイヤハーネス 4 の無理な引張が防止される。

【0046】なお、上記実施形態においてはガイドレール 2 をスライドドア側に設け、ボックス 7 を車両ボディ側に設けたが、この逆にガイドレール 2 を車両ボディ側に設け、ボックス 7 をスライドドア側に設けることも可能である。この場合、車両ボディ側のワイヤハーネス 8 がスライダ 3 に固定され、ボックス 7 内に車両ボディ側のワイヤハーネス 8 がループ状に収容される。スライドドア側のワイヤハーネス 8 をボックス 7 からスライダ 3

及び第一の固定部（クリップ）9を経てコネクタ11まで配索し、コネクタ11にスライドドア側のワイヤハーネス4をコネクタ接続することも可能である。

【0047】また、車両ボディ5のステップ部以外の部位、例えばステップ部6の後端壁26の後方にボックス7を配設することも可能である。また、前記ワイヤハーネス4のループ部28の巻き数は一巻きでなく二巻きないしそれ以上とすることも可能である。また、スライドドア1の全開前にスライダ3がガイドレール2のガイド溝13の前端（一端）13aに突き当たる、及び／又は、スライドドア1の全開前にスライダ3がガイド溝13の後端（他端）13bに突き当たるように、ガイドレール2の長さや位置を調整することも可能である。

【0048】

【発明の効果】以上の如く、請求項1記載の発明によれば、車両ボディからスライドドアに掛け渡されたワイヤハーネスがスライドドアの開閉時にボックス内でループ状に縮径することで、ワイヤハーネスの弛みが吸収され、スライドドアと車両ボディとの間へのワイヤハーネスの挟み込みやワイヤハーネスの無理な屈曲が防止される。また、同じくスライドドアの開閉時にワイヤハーネスがボックス内で縮径することで、ワイヤハーネスがボックスから繰り出されて伸長し、ワイヤハーネスの無理な引張が防止される。これらにより、ワイヤハーネスの傷みや変形等が防止される。また、ワイヤハーネスの弛み吸収機構として揺動アーム等の特別な部品を用いないから、構造が簡単で低コスト化され、組付工数も低減される。

【0049】また、請求項2記載の発明によれば、スライドドアの全開前にスライダがガイドレールの一端部に当接することで、それ以上のスライダの移動が阻止され、ボックス内のワイヤハーネスのループ部が縮径して繰り出され、それによりワイヤハーネスの無理な引張が防止されつつスライドドアの開扉がスムーズに行われる。これによりガイドレールの一端部側の短縮化が図られ、ガイドレールの小型軽量化・低コスト化とスライドドア側の機能部品の配置の自由度の拡大が可能となる。

【0050】また、請求項3記載の発明によれば、スライドドアの全開前にスライダがガイドレールの他端部に当接することで、請求項2と同様にそれ以上のスライダの移動が阻止され、ボックス内のワイヤハーネスのルー

プ部が縮径して繰り出され、それによりワイヤハーネスの無理な引張が防止されつつスライドドアの開閉がスムーズに行われる。これによりガイドレールの他端部側の短縮化が図られ、ガイドレールの一層の小型軽量化・低コスト化とスライドドア側の機能部品の配置の自由度の拡大が可能となる。

【0051】また、請求項4記載の発明によれば、ワイヤハーネスの引張時にボックス内のループ部が確実に縮径されて繰り出され、ワイヤハーネスの弛み時にワイヤハーネスがボックス内にループ状に確実に繰り入れられる。これにより、ワイヤハーネスの弛みの吸収と引張の防止とが一層確実に行われる。

【0052】また、請求項5記載の発明によれば、ボックスを車両ボディのステップ部に容易に組み付けることができるから、ボックスの組付作業性が向上する。また、スライドドア側のガイドレールに対してほぼ対向する位置あるいは近い位置にボックスを配置することができるから、スライドドアから車両ボディにかけてのワイヤハーネスの弛みが最小限に抑えられ、ボックスのワイヤハーネス収容効果が一層助長される。

【0053】また、請求項6記載の発明によれば、スライドドアの機能部品の数が多い場合等にガイドレールを車両ボディ側に配設し、ボックスをスライドドア側に配設することで、請求項1～3と同様の効果が奏される。

【図面の簡単な説明】

【図1】本発明に係るスライドドアの給電構造の一実施形態を示す斜視図である。

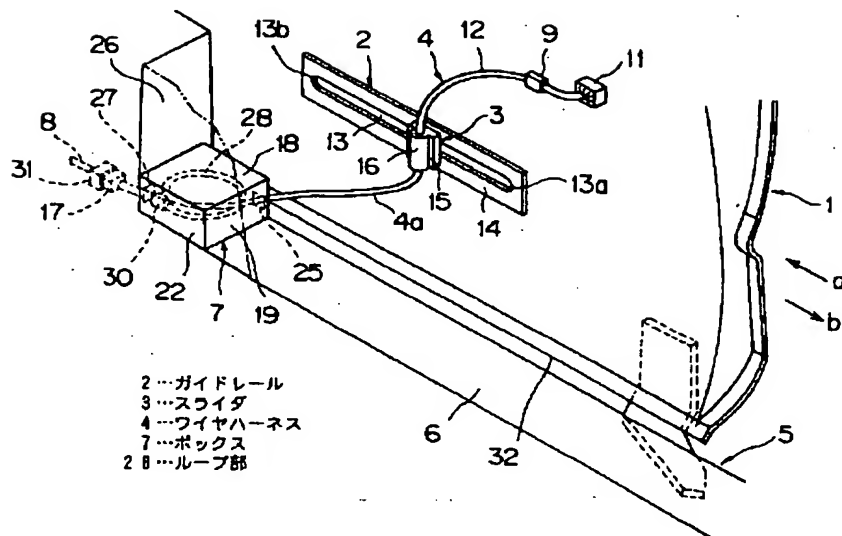
【図2】同じくボックス内にワイヤハーネスをループ状に収容した状態を示す斜視図である。

【図3】従来のスライドドアの給電構造の一形態を示し、(a)はスライドドア全開時、(b)はスライドドア全開時の状態を示す横断面図である。

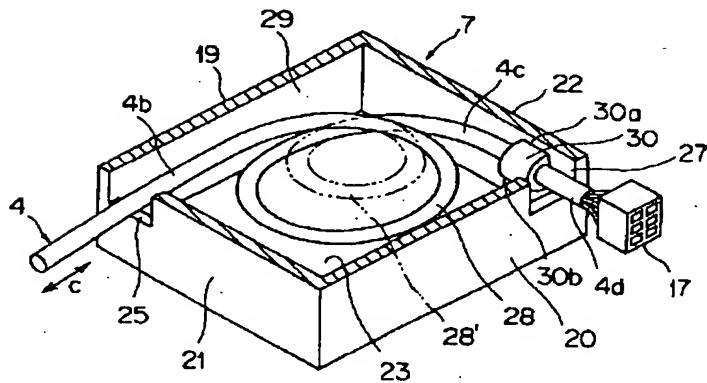
【符号の説明】

- | | |
|----|---------|
| 1 | スライドドア |
| 2 | ガイドレール |
| 3 | スライダ |
| 4 | ワイヤハーネス |
| 5 | 車両ボディ |
| 6 | ステップ部 |
| 7 | ボックス |
| 28 | ループ部 |

【図1】

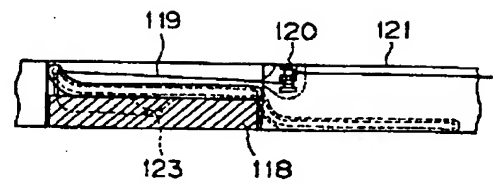


【図2】

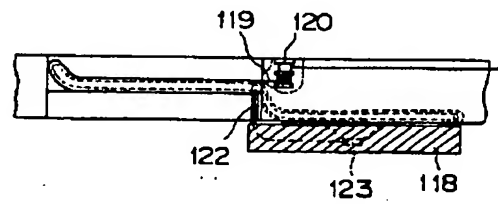


【図3】

(a)



(b)



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